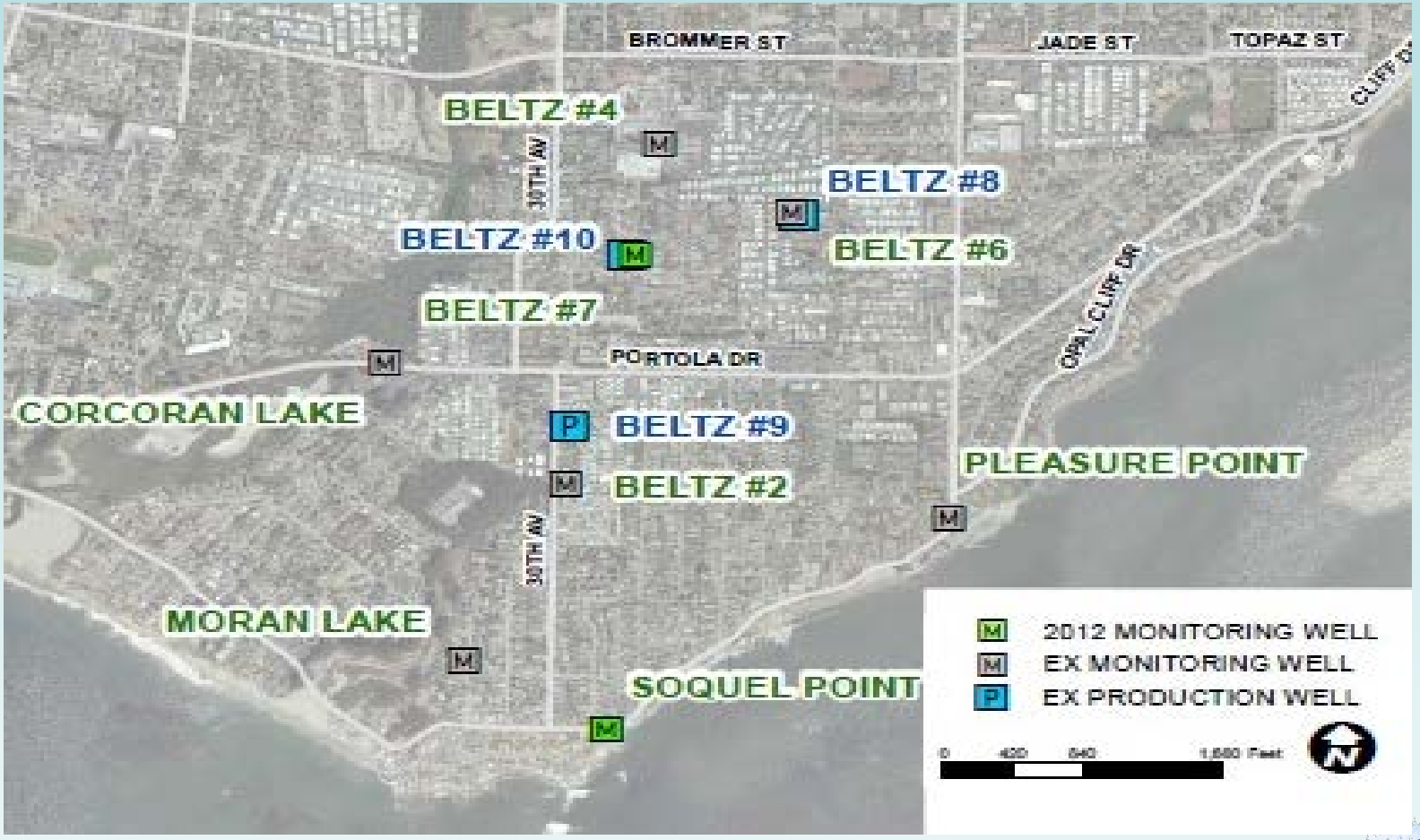
CITY OF SANTA CRUZ GROUNDWATER RESOURCES

Isidro Rivera, P.E.



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CITY OF SANTA CRUZ GROUNDWATER RESOURCES

1. GROUNDWATER FACILITIES
   A. Production Wells
   B. Monitoring Wells
2. SOQUEL-APTOS BASIN HYDROGEOLOGY
   A. Where do the City and neighboring agencies pump from
3. GROUNDWATER PRODUCTION
   A. Historic Groundwater Production
   B. Future Groundwater Production
4. WATER LEVELS AND TRENDS
5. RECENT AND CURRENT WORK

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CITY OF SANTA CRUZ GROUNDWATER FACILITIES

PRODUCTION WELLS

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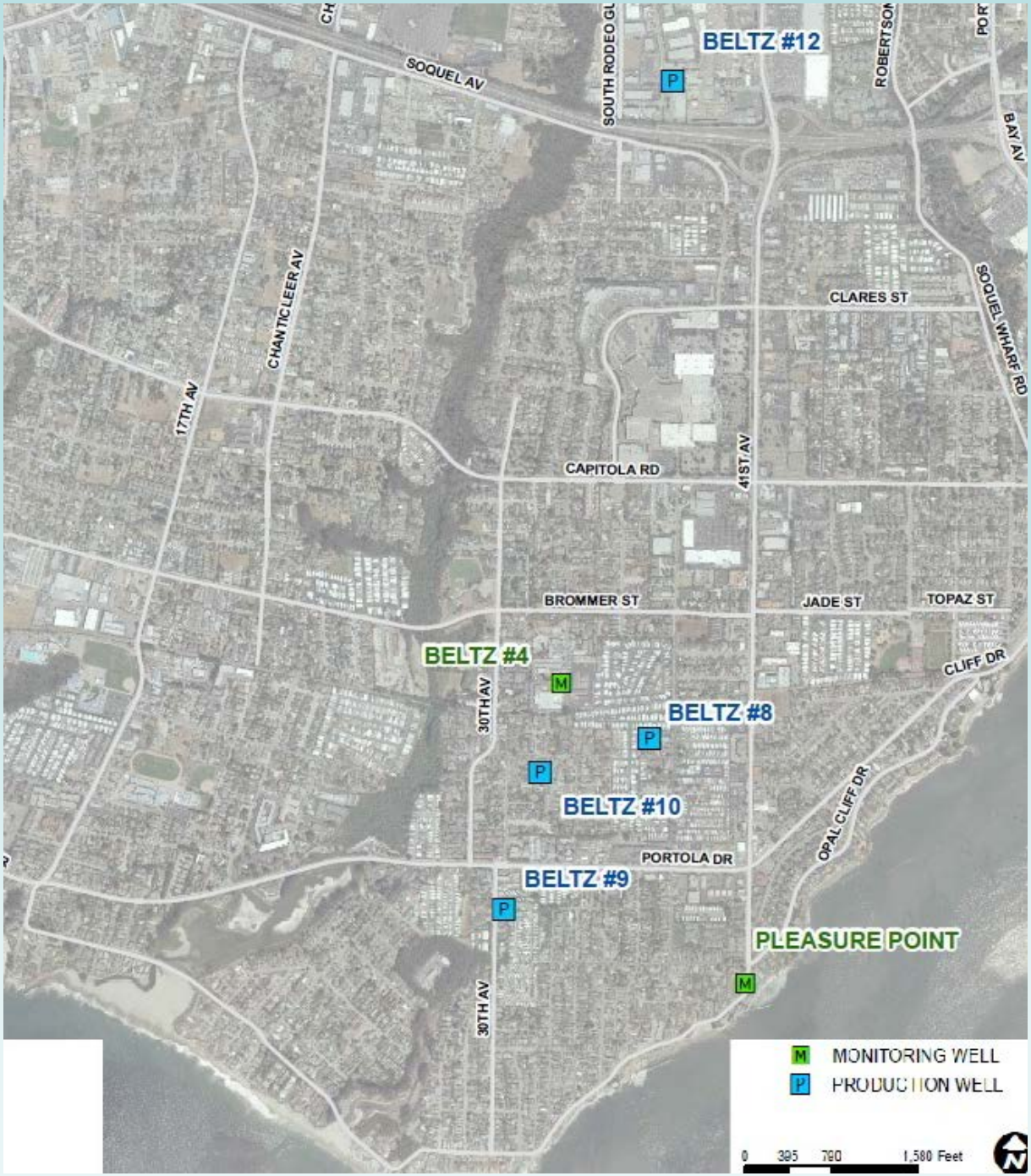

MONITORING WELLS

MONITORING WELLS INSTALLED PRIOR TO 1990

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MONITORING WELLS

MONITORING WELLS INSTALLED 2003-2004

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MONITORING WELLS

MONITORING WELLS INSTALLED 2009

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MONITORING WELLS

MONITORING WELLS INSTALLED 2012

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MONITORING WELLS

MONITORING WELLS INSTALLED 2013

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GROUNDWATER FACILITIES

MONITORING WELL LOCATION SUMMARY

A. TWO (2) MONITORING WELL LOCATIONS PRIOR TO 1990 (5 wells)

B. THIRTEEN (13) ADDITIONAL MONITORING WELL LOCATIONS SINCE 2003 (30 wells)

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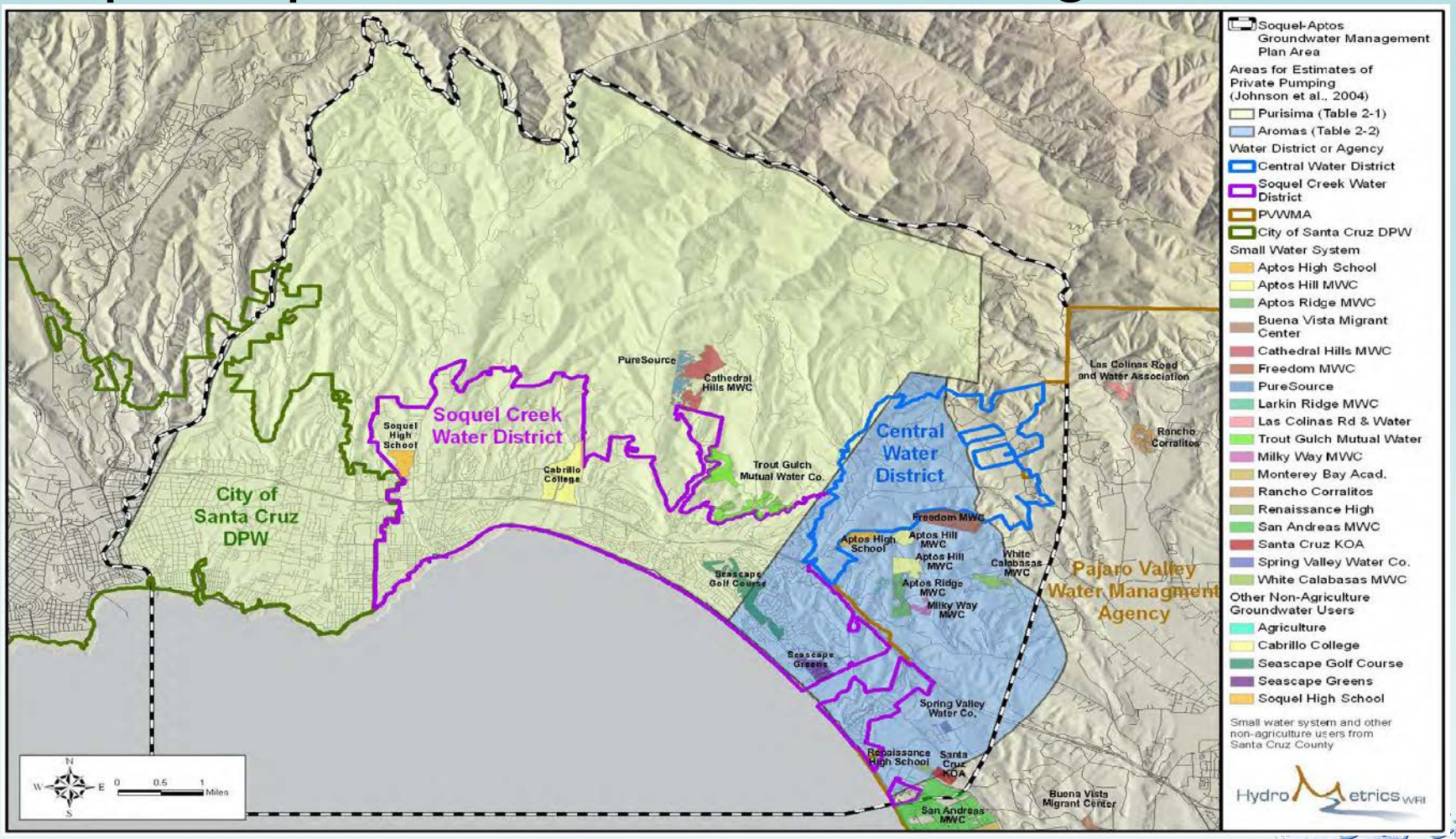
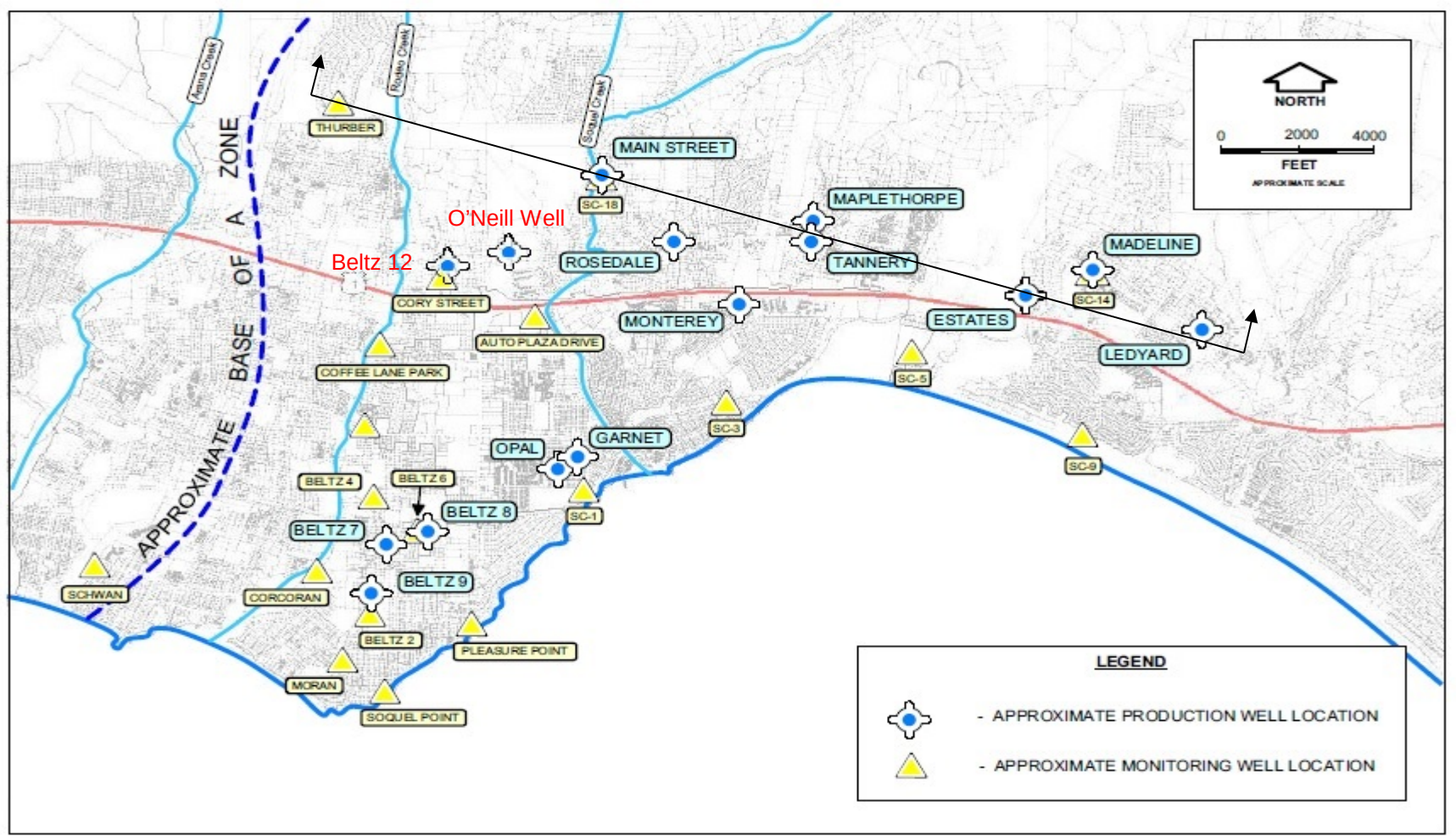
HYDROGEOLOGY

Soquel-Aptos Groundwater Management Area



Source: Soquel-Aptos Area Groundwater Management Annual Review and Report. Water Year 2012 . Prepared by Hydrometrics

HYDROGEOLOGY



WELL LOCATION MAP

Source: Supplemental Hydrogeological Study: Purisima Aquifer Delineation Live Oak-Capitola Area of Soquel-Aptos Groundwater Basin
Prepared by Hopkins Groundwater Consultants

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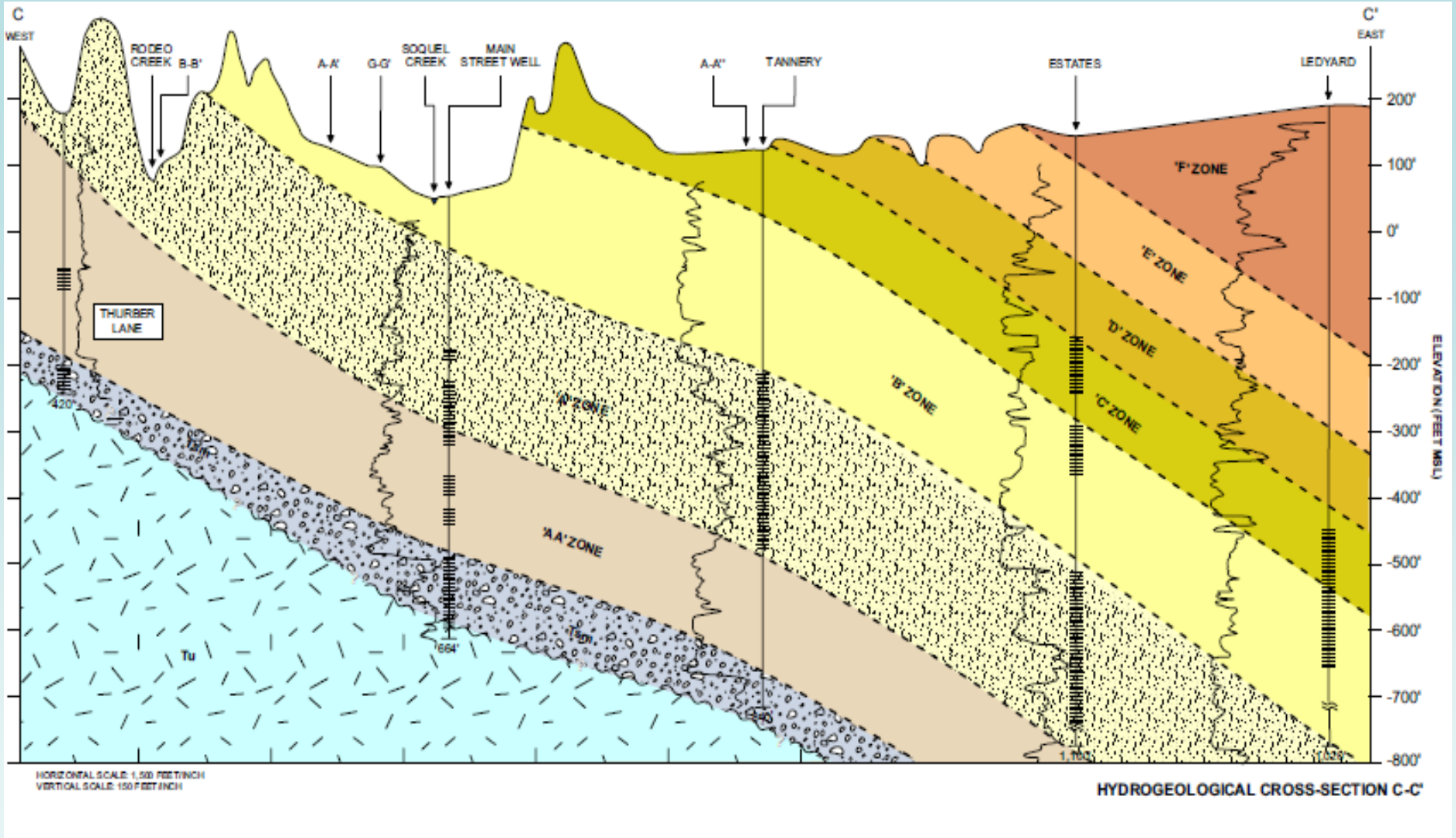
HYDROGEOLOGY



Source: Supplemental Hydrogeological Study: Purisima Aquifer Delineation Live Oak-Capitola Area of Soquel-Aptos Groundwater Basin
Prepared by Hopkins Groundwater Consultants

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HYDROGEOLOGY

Production Well	Well Depth (ft)	Screen Depth (ft, bgs)	Year Installed	Aquifer Unit	Well Production (MG)*
Beltz 8	210	100 - 180	1998	Purisima A	64.26
Beltz 9	230	110 - 200	1998	Purisima A	47.80
Beltz 10	362	124-140, 200-271, 301-327, 337-357	2004	Purisima A & Purisima AA	39.75
Beltz 12	650	200-290, 310-390, 410-470, 550-640	2012	Purisima A Purisima AA & Tu(SM)	-------

* Annual Average well production from 2004-2014

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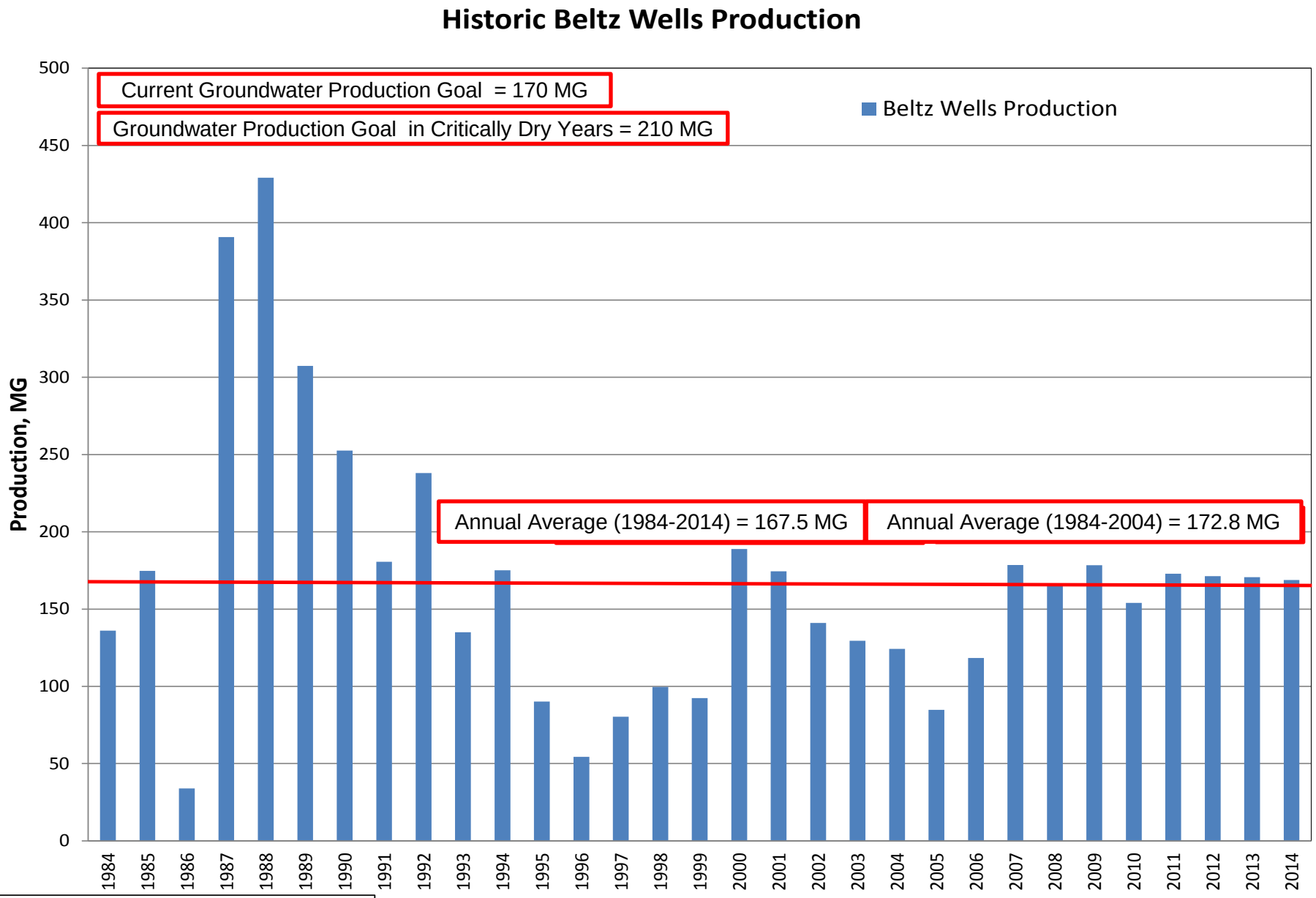
GROUNDWATER PRODUCTION



Yearly Production Based on Well Meter Reads
2014 Production through the end of October

Municipal Pumping in 2013 was 5,300 AF (~1,700 MG)
Total Bain Pumping estimated to be ~ 8,300 AF (~2,700 MG)

GROUNDWATER PRODUCTION

FUTURE GROUNDWATER PRODUCTION

A. 525 acre-ft/yr (170 MG) in non-critically dry years
B. 645 acre-ft/yr (210 MG) in critically dry years
C. Production goals based on maintaining groundwater levels that protect aquifer from saltwater intrusion.
D. Production goal includes all Beltz Wells (i.e, includes Beltz 12)

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GROUNDWATER PRODUCTION

BELTZ 12 FINAL ENVIRONMENTAL IMPACT REPORT

A. Established City Pumping Goals

B. Described 3 Voluntary Design Features

- **Groundwater Basin Monitoring/Adaptive Management Plan**
- Monitoring and Well Protection Program for Private Wells
- Soquel Creek Streamflow Monitoring Program

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GROUNDWATER PRODUCTION

COOPERATIVE MONITORING/ADAPTIVE GROUNDWATER MANAGEMENT AGREEMENT BETWEEN CITY OF SANTA CRUZ/SOQUEL CREEK WATER DISTRICT.

Management Objectives:

- Protect Soquel-Aptos Basin from Seawater Intrusion
- Allow for redistribution of pumping inland
- Maintain inland levels that promote flow toward coastal wells.
- Provide both agencies with flexibility to respond to changing water demands, changing water supply availability and infrastructure limitations.

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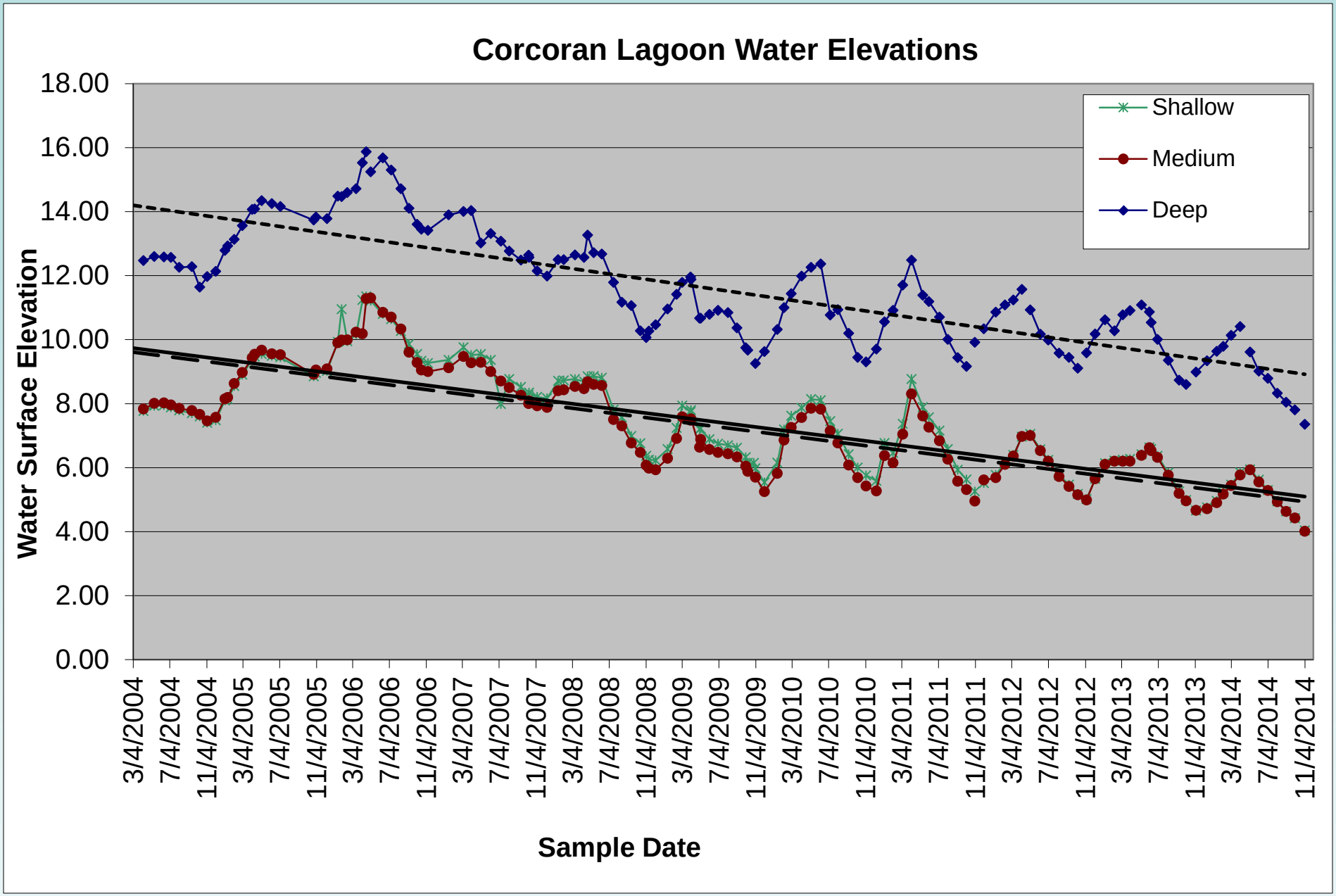
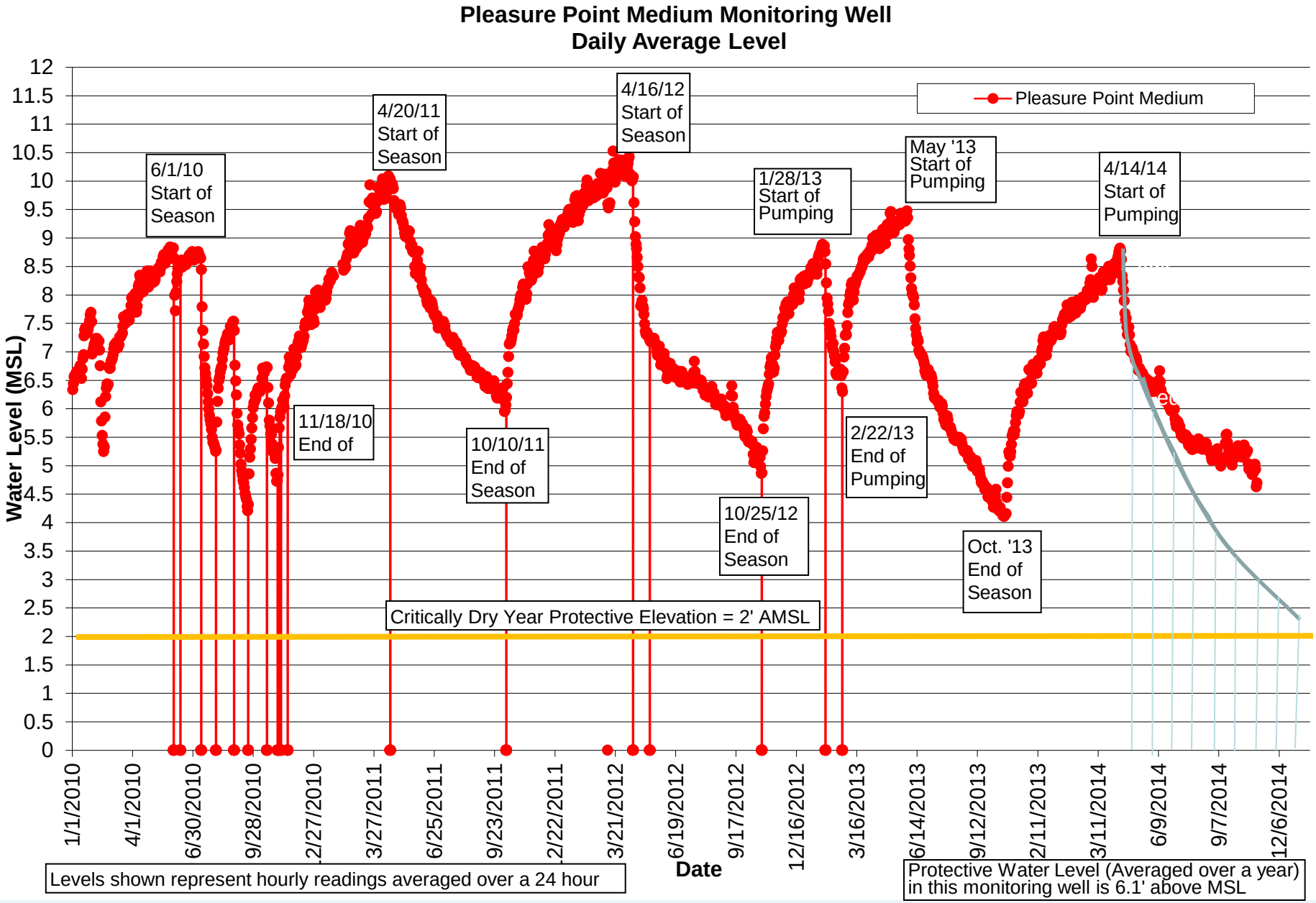
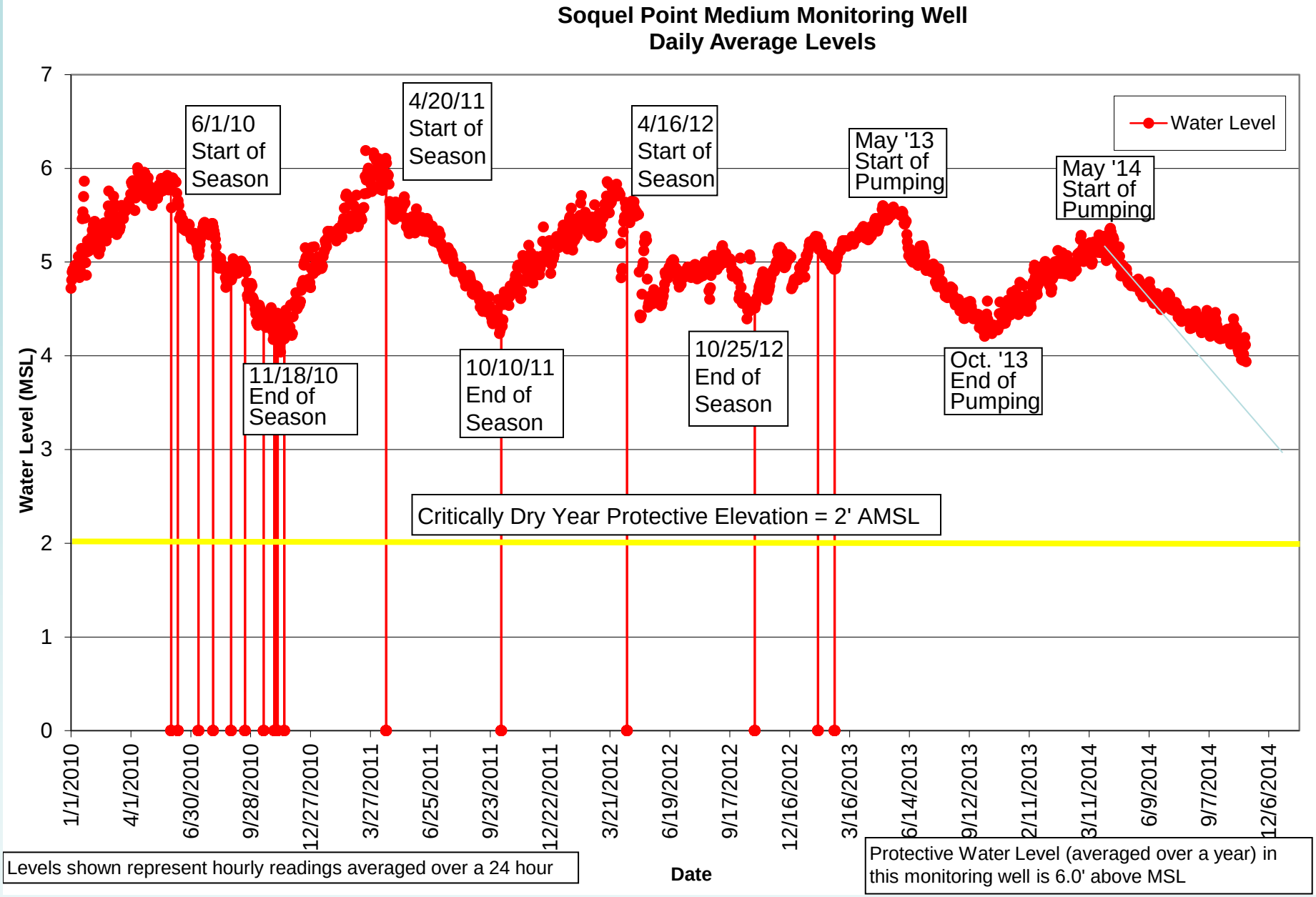
WATER LEVELS AND TRENDS



WATER LEVELS AND TRENDS



WATER LEVELS AND TRENDS



RECENT AND CURRENT WORK

1. CITY ACCEPTED INVITATION TO JOIN THE BASIN IMPLEMENTATION GROUP (BIG)
2. PARTICIPATE IN THE DEVELOPMENT OF THE SUSTAINABLE GROUNDWATER MANAGEMENT AGENCY IN NORTHERN SANTA CRUZ COUNTY.
3. PARTICIPATE IN THE DEVELOPMENT OF A GROUNDWATER MODEL FOR THE SOQUEL-APTOS BASIN.

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RECENT AND CURRENT WORK

BASIN IMPLEMENTATION GROUP

A. BIG was created in the mid-1990's to manage the Soquel-Aptos Groundwater area and to develop an AB3030 groundwater management plan.

B. Goal of accepting invitation is to expand and further develop the partnerships and collaborative groundwater planning efforts that had been developing over time.

RECENT AND CURRENT WORK

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

A. Allows the formation of a Groundwater Sustainability Agency (GSA) with authority to:
   - Develop a Groundwater Sustainability Plan (GSP)
   - Conduct Investigations
   - Determine the sustainable yield of a basin
   - Measure and limit extraction
   - Impose fees for groundwater management
   - Enforce the terms of the Groundwater Sustainability Plan

B. GSA needs to be formed by June 30, 2017 and GSP needs to be completed by January 31, 2022

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RECENT AND CURRENT WORK

GROUNDWATER MODEL FOR SOQUEL-APTOS BASIN

A. Model inputs will include:
   I. Pumping rates and locations (effect of coordinated pumping)
   II. Availability of supplemental supplies, specifically supplies that are recharged or injected
   III. Changes in hydrologic conditions/climate change

B. Model scenarios/outputs include:
   I. Comparing groundwater levels to established protective elevations for preventing seawater intrusion
   II. Time for basin recovery; i.e., time for groundwater levels to rise to protective elevations
   III. Effects of stream flow
   IV. Movement of seawater interface

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QUESTIONS?

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